Book Reviews

The correspondence of Charles Darwin. Vol. 7: *1858–1859*. Edited by F. Burkhardt & S. Smith. Pp. xxxv + 671. Cambridge University Press, Cambridge. 1991. Price £35 (ISBN 0–521–38564–4).

463 pages of this volume are taken up with the correspondence during the dates given; a further 34 pages record letters located or re-dated since the publication of *Correspondence* vols 1–6 (covering the years 1821–1857). The eight appendices include a chronology, an abstract of Darwin's theory of natural selection and a copy of Wallace's 'On the Tendency of Varieties to depart indefinitely from the Original Type', which forced Darwin's hand into publishing the *Origin*. Of the other appendices, one concerns a memorandum to H. M. Government about the status of the nation's premier natural history collections vis-à-vis the British Museum – plus ça change . . . In addition, there are comments on the manuscript, a bibliography, a biographical register and an index.

Of course, the nub of this volume is Darwin's preoccupation with his book *On the Origin of Species by means of Natural Selection*, the publication of which (1859) had to be brought forward as a result of Wallace's letter from the island of Gilolo in the Moluccas. As ever, there is much correspondence with his friend Joseph Hooker and his mentor, Charles Lyell, which reveals Darwin's doubts about rushing into print over his theory – would that some modern workers might so reveal their innermost feelings about their pet ideas. Nor does Darwin seek succour solely from his great contemporaries; many of his letters seek information on points of detail from a host of less noteworthy correspondents.

Apart from the scientific 'dynamite' enshrined in this correspondence, however, the reader continues to be given access to a view of a stratum of Victorian life scarcely touched upon by Dickens, for example. Nevertheless, the death, from scarlet fever, of his youngest child, Charles Waring, at the age of two years is a reminder of the universal perils of the age. The agony of this event, revealed in a letter to Hooker, is counterpointed by a letter to Darwin's eldest child, William, about a younger (George) son's prowess at billiards.

With its revelations of the ways in which a great scientist arrived at one of the seminal biological theories of this or any other age, together with a view of the society within which such ideas developed, this volume is of widespread interest and value. It continues the feast of high scholarship which is epitomised by this distinguished editorial and publishing treatment of Darwin's *Correspondence*.

D. M. Moore

Genetics and conservation of rare plants. Edited by D. A. Falk & K. E. Holsinger. Pp. xviii + 283. Oxford University Press, Oxford. 1992. Price £35 (ISBN 0–19–506429–1).

Rare species are on the increase; the public expects botanists, who have highlighted the problem for so long, to develop workable schemes that prevent the extinction of endangered species. This book, resulting from a 1989 conference convened by the Centre for Plant Conservation in St Louis, helps to ensure that such schemes have a strong scientific basis. The complementary approaches of 'off-site' and 'on-site' conservation are examined. Limited space is given however to the complexities of re-introduction.

Building on what is known of rare plant population biology, the book then considers methods for sampling, assessing and conserving their genetic variation. Finally the conclusions are drawn together into a set of practical guidelines for conservation programmes. One of the strengths of the book is that it calls on expertise in the fields of zoology, forestry and crop genetic resources. Here the authors have successfully focussed their expertise on the specific problems faced in conserving rare plants. It is a pity, however, that the chapter on germplasm management failed to emphasise such practical problems as 'empty' seeds in seedlots of wild species.

There are some very valuable contributions from leaders in the field of plant population genetics. Hamrick *et al.* point out the relative benefits of using morphology, isozymes and DNA studies in assessing genetic diversity. In these 'high tech' days, it is comforting to know that measurements on 'real' plants still have a valuable part to play in such assessment.

Not surprisingly, the book draws mainly on examples from the Developed World. In the Developing World, the ratio of botanists to species means that the biology and even rarity of a species is often not known. This makes development of conservation programmes difficult. Broad generalities help. Biodiversity within wet tropical forests will be best conserved 'on-site' (see contribution from Bawa & Ashton). In the dry tropics, however, where desertification threatens, long-term conservation may often only be achieved through 'off-site' activities. The broad statement on page 114 that tropical species' seed cannot withstand drying and cold storage is erroneous; many dry tropical species are quite amenable to seed storage. With the clock ticking, there will be little time left for detailed studies in many cases to determine the best conservation strategy. Indeed, many of these studies will only be possible once material has been taken into safe keeping in seed banks and botanic gardens; so by using the sampling guidelines given in this book we should conserve something now and worry about the precision of the approach later on.

In summary, this volume has been well edited, has a wealth of information bringing together some 850 references and has been produced to a high standard. A proportion of the book is accessible to the general reader; the more genetical elements might have been more so had a glossary been included. The book is an important step towards practical action. Botanists and conservationists will find it a useful addition to the literature.

S. H. LININGTON

The Hamlyn photographic guide to the wild flowers of Britain and Northern Europe. R. Gibbons & P. Brough. Pp. 336, including 163 pp. of colour plates. Hamlyn Octopus, London. 1992. Price £20 (ISBN 0–600–57452–0).

Here is yet another illustrated Wild Flower book, but this time it is hardly a field guide. Its size, 22 × 29 cm, is too large for most pockets, and its weight, 1·63 kg, is too heavy for most rucksacks after packing waterproofs, food, camera, etc. It must therefore be considered as an indoor reference book, as even a quick glance showed it to be more useful than the proverbial coffee table book.

After the general acknowledgments and bibliography are two pages of introduction and explanations on using the book, and two pages of glossary terms with diagrams. Then follow 320 pages with descriptions of over 1,900 species and 1,500 colour photographs, 1,000 distribution maps and more than 400 line drawings of important identification characters.

The text and illustrations are arranged according to the systematic order used in *Flora Europaea*, and with a few minor exceptions the nomenclature also follows *Flora Europaea*. Grasses, sedges and rushes are not included.

The distribution maps, text, line drawings and photo index on the left-hand page and 8–12 relevant photographs on the right-hand page do make reference easy. The photographs are lettered in a diagram of the plate layout, and the letter identifies the map, text and index of photographs. Where possible the English name is used in the marginal photographic index. Both the scientific and English names are given in the text.

On the whole the photographs are good. Some appear to have been selected to show important characters separating 'look-alikes' such as *Potentilla sterilis* and *P. micrantha*. It is a pity that a few photographs are enlarged more than other members of the same genus on the same plate. This could be confusing to a beginner, even though size may be given in the text. Two examples are the smaller species of *Cerastium*, and *Sedum villosum* is so much smaller than *S. telephium*.

The distribution maps, though of necessity tiny, are an added interest and the colour codes give an idea of the status of the species where it does occur. The area covered is about the same as in previous Floras of Britain and Northern Europe.

The line drawings are necessary for some species as even good photographs cannot show smaller critical features, but there is space in the margins for a few more. A beginner with an unknown flower and no knowledge of plant families will be faced with the daunting task of turning page after

page in search of a photographic match. There is no key, but descriptions of families appear in systematic order in the text and species in the larger genera are grouped under headings of similar characters. The last six pages contain a combined index of English and scientific names, which makes for easy reference.

A few errors are inevitable in such a work, but the index has over 20 omissions.

While I find the book too large and heavy for use in the field, I certainly enjoy the photography and find the distribution maps interesting, though a few do not agree with the distributions given in the text.

V. GORDON

Bob Press's field guide to the trees of Britain and Europe. J. R. Press; photographic consultants E. & D. Hosking, artwork by M. Tebbs. Pp. 247, with numerous colour plates and black and white illustrations. New Holland, London. 1992. Price £17.95 hardback (ISBN 1–85368–103–2); £9.99 paperback (ISBN 1–85368–104–0).

Field guides are a popular theme for publishers, and this is a fine example of the category. Richly illustrated with colour photographs and line drawings, in a format which allows the inexpensive production of versions in other languages, and with enough information to allow a reasonable chance of successful tree identification, this book is likely to prove very popular. The simplicity of style is similar to that of Oleg Polunin's, but Bob Press has been able to use the pick of the photographic agencies rather than relying mainly on the work of one person.

The coverage of tree species is wide, with over 450 species treated; native and naturalised species are given equal emphasis, with all the main species illustrated by at least one colour photograph. Line drawings in the left hand margin emphasise smaller features helpful for identification, and there is a short glossary of terms. Keys are in two forms: a numbered dichotomous key relying on both foliar and floral characters, and a synoptic key based entirely on leaf characters. The 52 families are described briefly in the introductory pages, facilitating comparisons and avoiding interruptions to the text. Text descriptions include a rather generalised indication of the distribution of the tree in Europe, followed (for naturalised species) by an indication of their country of origin. There is an appendix with information on arboreta, and a short bibliography. Separate indexes to common names and scientific names are provided.

The high quality of reproduction of colour photographs now achievable by modern publishers is well displayed in this inexpensive book, which was printed in Singapore. Taxonomically up-to-date, and concisely written, the book is unfortunate only in its title. Why, in 1992, does a publisher choose to refer to "Britain *and* Europe"?

J. R. EDMONDSON

Biology of plants. 5th edition. P. H. Raven, R. F. Evert & S. E. Eichhorn. Pp xvii + 791; lavishly illustrated. Worth Publishers, New York. 1992. Price $59.95 (ISBN 0–87901–52–2).

This substantial book is the latest in a long tradition of all-embracing introductory Botany textbooks. It is a marvellous introduction to botanical science, with a well organised and very readable text supported by excellent diagrams and photographs, almost all in colour, on nearly every page.

Biology of plants has 31 chapters divided into six sections covering cell biology, genetics, diversity, anatomy, physiology and ecology. Scattered throughout the book there are also essays, separated from the main text, discussing topical themes such as 'The Great Yellowstone fire' or 'Jobs versus owls'. The level of treatment is generally aimed at the first year university student, and is designed primarily for its North American home market. This is only really noticeable in the chapter covering vegetation types, which perhaps leans too heavily on North American case histories to the exclusion of more representative examples elsewhere in the world.

As would be expected, recent advances in plant physiology and molecular biology are well

covered, but there are also some interesting reinterpretations of long-known phenomena; for example, the 'infection' of grasses by ergot is now seen as a partnership in which the grass receives protection from herbivores by the toxic fungus.

My main criticism of the book concerns the authors' definition of what is a plant. They exclude algae from their Kingdom Plantae, leaving only the bryophytes and vascular plants. The green algae are thus separated from their descendants, and giant kelps are left as odd bedfellows to the unicellular Protista. Despite this divorce, the actual coverage of the algae, as well as the more traditional 'non plants' – viruses, bacteria and fungi – is one of the most comprehensive of any introductory textbook I have seen.

At around £40 for 800 pages *Biology of plants* is an excellent value textbook from A-level onwards, but it would be a shame if its only audience were students. It is an excellent introduction to the world of plants for anyone, and with superb plant paintings by Rhonda Nass and a beautiful cover, courtesy of Van Gogh, it might even find its way on to one or two coffee tables.

A. S. GUNN

British plant communities. Vol. 2: *Mires and heaths*. Edited by J. S. Rodwell. Pp. x + 628. Cambridge University Press, Cambridge. 1991. Price £95 (ISBN 0–521–39165–2).

In 1989, I was, for all too brief a period, the last appointed Chief Scientist of the Nature Conservancy Council (R.I.P.). While in the post, however, my most pleasant task was to bring the National Vegetation Classification to its triumphal climax as a manuscript to be transmitted to the publishers, Cambridge University Press. Last year I saw with pleasure the first volume (reviewed in *Watsonia* **19**: 49, 1992). Unlike volume 1, which dealt with woodlands and scrub, this second volume is a truly 'British' volume, in that it deals with vegetation that is centred on Britain, and which makes Britain special. Here is a tremendous compendium of information on mires and heaths – long needed, but it will also be long used.

The format seems well suited to the task. The community descriptions do not lend themselves readily to review, except for the passing comment that they are very thorough. The separate introductions to mires and heaths are well crafted, and excellent synopses, although there are some dense passages. For example, "The perspective looking towards the Continent from our own generally oceanic standpoint is rather different from that hitherto proclaimed as normative from the opposite direction" (p. 350).

At 38 plant communities, one might query if the mire classification were not too fragmented. The difficulty of identifying homogeneity in mire vegetation, as well as the variation in substrate and climate across Britain, all contribute to mires being such rich systems, and explain why so many units are described, I found the 'block' diagrams gave an instant clarity of view for ecological position. The discussion of the changing community context of *Schoenus nigricans* is also of interest to illustrate that communities are but spatial and temporal kaleidoscopes of species. But here is also a weak spot – for it would be marvellous to see that discussion set in a broader context of Ireland and the western fringe of Europe north and south. Given the 20 year support from the (J.)N.C.C., and the fact that they have an international branch, it would be good if future volumes could take a wider view. Even if that is not possible, I hope someone will eventually fund and produce a synthesis of British plant communities in their European context.

With regard to heaths, the point is well made that without appropriate management heaths become very hard to distinguish, and tend to a uniform Callunetum; which has clear conservation implications. It also underlines the very dynamic nature of these communities. Again, the introductory description is sound, and the block/circle diagrams are helpful to explain lines of variation. However, I believe it is simplistic to suggest that lowland dry heaths are a linked circle; for my money there are two clear groups corresponding to the Ulicetalia minoris and Vaccinio-Genistetalia, as discussed by Bridgewater (1980) in *Phytocoenologia* **8**: 191–235. The Ulicetalia minoris is a southern and western order and the Vaccinio-Genistetalia an eastern and northern order, with some overlap between.

Boundaries between wet and dry heaths probably deserve more discussion throughout the volume. So too does the position of *Erica ciliaris* heaths, which are given rather short shrift in this

current treatment. The associations Ulici gallii – Ericetum ciliaris and Ulici minoris – Ericetum ciliaris described by Bridgewater in 1980 I still regard as valid, but vegetation represented by these associations is not even accorded variant status in this current work. Others will be able to test these different views – provided it is done in a fully European context. As the author says (p. 13) "For the classification is meant to be not a static edifice, but a working tool for the description, assessment and study of vegetation". Indeed, I sincerely hope that one by-product of the series will be an increase in phytosociological papers in the British journals, as well as the expansion of British papers in the continental ones.

Keys are provided for both mires and heaths. Do they work, and are they worth the effort? I used them with sample data collected during the last three years. The results? Success every time, despite some rather obscure wording of the couplets.

This is a book any botanist interested in phytogeography and vegetation will want to buy. And so here is my biggest gripe, aimed not at the superb work done by the contributors, but at Cambridge University Press. Having hired excellent and far-sighted editorial staff to secure works like this for their list, why then price them out of most libraries' reach, let alone interested botanists? If I want to buy the book here in Australia, the price is $325!

But enough of gripes – this work is elegant testimony to those who developed the concept, and participated through the years, but especially to John Rodwell who has the fortitude to have ridden out the all-too-many rough patches, when it seemed the end would never come. And from my personal knowledge, Lynne Farrell, once of the N.C.C. and now English Nature, did an excellent back-room job, steering it through the shoals of Government bureaucracy. We should all look forward to the third volume.

P. B. Bridgewater

FLORA: The Computerised key to 786 species of British wild plants, version 1.10. Poly Enterprises Plymouth Ltd, Seale Hayne Faculty, Polytechnic South West. Newton Abbot. 1992. Price £99.88, with discount for multiple copies.

Recent years have seen a great increase in general use of computers and botanists have been quick to explore the possibilities to which computer technology can be put to aid their studies. Several programs have been developed with the naturalist in mind, building databases for use in plant recording, mapping, etc., and some have delved into the realms of plant identification. Computer aided keys have appeared for specialist groups (e.g. sedges and orchids), but *FLORA* is the first published attempt at a general usage computerised key to British flowering plants.

The *FLORA* package contains a disk (with the databases and program), a User Instruction Manual and a botanical reference manual. Once loaded on to the hard disk of your machine (taking up a tiny 260K) the menu-driven program enables plants to be identified using a multi-access approach, with a total of 48 possible characters to choose from. Characters are grouped into categories, according to the approach of the user. Three general categories (primary, secondary and tertiary) hold groups of characters in descending order of their usefulness in identification. The characters are also grouped into categories relating to the flower, leaf, stem or environment. In general, identification begins in the primary category, and character states are entered against those characters evident from the specimen. For novices to the program there is a 'beginners tour' leading you through all the characters in the primary category showing all their possible states. When a few characters are entered the database can then be usefully searched for matches. The program sorts through the database and the species are listed in descending order of likelihood. If need be you can return to the category summary tables and enter more character states until the search gives a fewer number of possibilities. At this stage you are advised in the instructions to turn to other botanical reference books for descriptions and pictures.

Having used the program myself, and enlisted the help of others less experienced in plant identification, I have found that the program is relatively easy to use, and generally successful. The authors claim that as few as six characters need to be entered to effect an identification. My experience is that unless you know which characters will narrow down the field quickly you will probably have to key in considerably more. This leads me into my first criticism of the program, the

lack of on-line help facilities. It would be very useful to be able to list the characters that will differentiate effectively between your shortlist of species, and thereafter concentrate your efforts.

With the great diversity in plant form across the families it is very difficult to produce a general list of characters and their states that will deal with all species in a satisfactory manner. The writers of *FLORA* have had to simplify this variation, and on the whole they have produced a workable system, and have tried to avoid using technical terminology. There are some rather odd character states; for example *Rumex* flowers are described as 'grass-like', and the character 'leaf venation' not only caters for parallel, pinnate and palmate venation but also for succulence and compound leaves. In order to save storage space and to increase compatibility with non-graphics supporting computers, the writers have decided not to include illustrated help screens, but rather to rely on the botanical reference manual. Even allowing for the promised reprint (initial problems with printing have left many of the drawings faint and some unusable) the booklet does not to my mind clearly define the characters and this has led to mis-scoring of characters when testing the program (in the botanical reference manual the same leaf shape, obovate, is included in both 'paddle' and 'oval' character states).

As with many partial Floras this program falls down in its depth of coverage. Grasses, sedges, rushes and gymnosperms are excluded, and critical groups (e.g. *Euphrasia* and *Salix*) are treated as aggregates. Looking at some of the datasets used there are an alarming number of missing data for the species included. This leads to problems when separating some of the species. Although much of the terminology is non-technical, a certain degree of botanical knowledge is required to operate the program and sort out errors of scoring that frequently arise. I can see the potential for this program in schools and field centres (particularly with the educational discount price) where it could be used to encourage children to look at and identify plants. If *FLORA* was considerably cheaper then I could see more botanists buying a copy, but at the quoted price most field botanists would be better advised to invest in one (or two!) of the full Floras of the British Isles.

M. F. Watson